Brazil's second *catch-up:* characteristics *and constraints*

Antonio Barros de Castro

Professor,
Rio de Janeiro Federal University (Brazil)
abarroscastro@uol.com.br

The Brazilian economy, traditionally one of the most closed in Latin America, was finally opened up to international trade between 1988 and 1994. The impact of enormously increased exposure to international trade was very different from what had been foreseen, either by defenders or by critics of liberalization. This paper seeks to describe the most important changes subsequent to liberalization, by comparing them to what happened in the classical period of Brazilian industrialization. In both periods (1940-1980 and 1990-1999), there was rapid copying of features of industry in the central economies. In both cases, then, catch-up movements took place in the country. But there can be no doubt that these two levelling processes differed greatly in their characteristics, consequences and limitations. In this paper, we attempt to contrast the main features of the two movements.

I

Facts and hypothesis

The starting point for this paper is a set of interrelated hypotheses that can be summarized as follows.

By 1980 Brazil had established an industrial structure in which the relative sizes and levels of diversification of the different sectors broadly matched their counterparts in medium-sized developed economies.

Between 1980 and 1994 the country suffered a period of major macroeconomic upheaval, during which few new factories were established or new production techniques introduced – even the range of goods produced by manufacturing industry remained largely unchanged. At the height of the macroeconomic turbulence there was also little point in firms' trying to increase productive efficiency.

When the policy to open up the economy was announced in 1990, Japanese-style business organization and management methods began to be introduced in Brazil, having spread across the developed economies during the 1980s. In the early years of the decade, enterprises were caught in the crossfire between shrinking markets and (initially moderate) import growth, so change only became more widespread in the second half of the 1990s (Barros de Castro, 2001).

The major expansion of domestic markets, in conjunction with the local-currency overvaluation that accompanied stabilization, encouraged many firms to react to import competition by modernizing and lowering the prices of their products. In doing so, they apparently had no hesitation in expanding their own purchases abroad.

The significance of this type of reaction, in which imports act as a double-edged sword, is ambiguous: it may indicate the start of an intensive process of industrial modernization and recovery; or alternatively, it could herald industrial decline. In either event, the start of more profound changes, through increased imports, would characterize both domestically-owned and multinational firms alike.

The economy's modest industrial performance in the 1990s (2.7% growth per year) is usually contrasted with the gains achieved in labour productivity. In fact, industrial output per worker grew by an average of 8.5% per year during the 1990s, according to the Monthly Survey of Industry (PIM) published by the Brazilian Geographical and Statistical Institute (IBGE), or 5.4% according to the National Accounts (see Carvalho, 2000).

From the standpoint of this paper, however, the following points are just as relevant as the changes seen in average productivity indices:

— The structure, linkages and functioning of industrial firms underwent profound change in the 1990s. These began with the adoption of new management methods and patterns of work organization and intensified as stabilization took hold, with new inputs being introduced and obsolete equipment gradually being replaced;

— This resulted in new range of products being launched on the market;[1]

— Although the new products were more up-to-date, they did not represent the state of the art in their respective sectors. The new products were technologically "mature" and "ready" for the market (in the sense that demand for them already existed);

— The changes required to rapidly place the "new" products on the market affected production first and foremost – usually inside the factory gate (Barros de Castro, 2001). In many cases, however, the process was accompanied by mergers and take-overs, together with cooperative ventures and partnerships. In traditional industries, in particular, they were sometimes reinforced by "new local arrangements".[2]

— Lastly, the results achieved in terms of manufacturing units seem to closely match those of developed countries; at least, this is a point often emphasized in field interviews. In fact, in the subsidiaries of multinationals and most particularly among newly established units (greenfield investments), it is not uncommon for the new plants to be more advanced, in certain respects, than the best units existing in the firm's country of origin.[3]

This by no means applies to all enterprises, however, and two important factors need to be taken into account.

[1] On this point, see Carvalho and Bernardes (1998).

[2] Cassiolato and Lastres eds. (2000) provide a survey of these changes.

[3] An important source of information on the intensive process of enterprise change is the *Empresas & Carreiras* section of *Gazeta Mercantil*, which publishes sectoral and regional reports on a periodic

The combination of low wages, "informality" (involving tax evasion and non-payment of social-security contributions) and second-hand equipment markets, tends to encourage outdated business practices and low productivity. In addition, the decline in the number of industrial workers from 1990 to 1999 helped semi-marginal or marginal businesses to survive and even flourish –employment fell to about 52% of its previous level according to the IBGE Monthly Survey of Industry (PIM). The long tailback of more or less "informal" enterprises that benefit from such factors clearly lowers general productivity levels and makes international comparisons difficult. Far from indicating industrial backwardness, however, this projects on to the manufacturing sector the consequences of the country's economic and social heterogeneity –in addition to the repressed activity levels that the economy experienced on a recurrent basis during the 1990s. This is reflected in the distribution of industrial firms by size, average wage and industrial value-added (see Table 1).

This, in short, is a permissive environment in terms of the survival chances of modest-sized firms with limited resources;[4] but it has not precluded a rapid increase in (overall) average labour productivity. This applies both to growth years and to periods when the pace of output has slowed or even declined.

The second factor is that soon after stabilization (roughly in 1995-1996) there were signs that Brazil might follow the prevailing trend in Latin America at the time, with industrial sectors disappearing and activities becoming concentrated in the final stages of production. Although this negative development was largely avoided in the Brazilian case, the industrial fabric by no means emerged unscathed, as the electronics industry atrophied –having already been facing serious difficulties prior to opening-up and stabilization.

The following table 2 gives an idea of the continuity of the industrial structure.

A summary of the hypothesis put forward in this paper is presented below.

Brazil's modern industrial structure, which was fully established by around 1980, is the outcome of a successful initial catch-up process. Then, following a lengthy period of hibernation, the renewal/modernization of the product basket and large-scale absorption of organizational and technological improvements during the 1990s, can be seen as a second catch-up phase. This second stage differs in several ways from the first, but both episodes share a key feature of all catch-up processes, namely deliberate and rapid imitation of the characteristics of industries in developed economies. A brief digression on this point is needed here.

Following Gerschenkron (1962), various authors have used the concept of "leapfrogging" to describe how industrially backward nations attempt to catch up with more advanced ones through imitation. In my opinion, this approach offers a superior conceptual framework than the more limited notion of "import substitution". The latter seeks to understand late industrialization as a series of (automatic?) responses to periods of constraint and slack in the balance of payments. In addition to according a central role to the decision to embark on change and to the institutions established for that purpose (Barros de Castro, 1993), the catch-up concept also gives due importance to technological constraints.

In addition, this approach both emphasizes and relativizes the concept of imitation – the basic phenomenon in the historical leaps we are discussing here. In practice, the copying process is subject to historical adaptations and substitutions (as Gerschenkron pointed out) and is therefore selective. As traces of industrial heritage are usually conserved[5] and individual differences develop along the way, the process, if successful, is liable to produce a different and even totally new reality.[6]

basis. The author is unaware of any way of adding to the copious information contained there, and in other journals and publications. Another important source are case studies (of firms) and sectoral studies carried out by various research centres, which often end up as postgraduate theses. For the early part of the decade, an important source is the collection of studies that formed the basis for the *Estudo da Competitividade Industrial*, carried out from August 1992 to December 1993, coordinated by Luciano Coutinho and João Carlos Ferraz, and published by UNICAMP in 1994. In view of the unprecedented nature of the experience, however, there is no substitute for collecting information through interviews with the firms, and with the entrepreneurs and technical experts in the industrial plants themselves. With regard to the high levels of performance achieved in several sectors, see the McKinsey report, *Productivity - The key to an accelerated path for Brazil*, 1998. There is a further reservation, however: even in medium-to-large firms, current wage levels in Brazil (especially for low-skilled jobs) continue to justify automation levels below those seen in developed countries.

[4] According to the same source (IBGE, *Pesquisa Industrial Anual - Empresa* 1999), small and medium-sized enterprises accounted for 91.5% of all firms, 26.7% of employment and 13.8% of net revenues in 1985; and 93.7%, 37.8% and 15.2% respectively in 1999.

[5] The Japanese catch-up experience shows that restoring traces of a distant past can be important for a concentrated industrial catch-up effort.

[6] A very interesting paper on historical experiences of overcoming

TABLE 1

Brasil: Indicators of size, by number of persons employed, 1990

Size of firms by number of persons employed[a]	Average monthly wage *(reais)*	Industrial value added per worker *(thousands of reais)*
Micro/small	440	15.7
Medium	762	37.7
Large	1175	71.8
Industry total	793	42.0

Source: IBGE, Directorate of Surveys, Department of Industry, *Pesquisa Industrial Anual - Empresa* (Annual Survey of Industry - Enterprise), 1999.

[a] The classification criteria used are as follows: Micro/small - employing from 5 to 99 persons; Medium - from 100 to 499 employees; and Large - employing 500 or more persons.

TABLE 2

Brasil: Structure of manufacturing industry by value-added, at current prices, 1991 and 1998
(*percentages*)

		1991	1998
04	Manufacture of non-metallic minerals	5.5%	5.5%
05	Iron and steel	4.2%	3.2%
06	Non-ferrous metallurgy	2.1%	1.7%
07	Manufacture of other metallurgical products	5.7%	5.3%
08	Manufacture and maintenance of machinery and tractors	7.9%	8.9%
10	Manufacture of electrical appliances and equipment	3.2%	2.7%
11	Manufacture of electronic appliances and equipment	3.9%	2.8%
12	Manufacture of automobiles, trucks and buses	2.6%	3 %
13	Manufacture of other vehicles, autoparts and accessories	3.9%	3.5%
14	Sawmills and manufacture of wooden articles and furniture	3.7%	3.3%
15	Paper and graphics	5.9%	4.1%
16	Rubber	1.6%	1.4%
17	Manufacture of chemical products (excl. petrochemicals)	3.8%	3.8%
18	Oil refining and petrochemicals	9.1%	14.8%
19	Manufacture of miscellaneous chemical products	5.2%	3.7%
20	Manufacture of pharmaceutical and perfume products	2.2%	4.5%
21	Plastics manufacturing	2.7%	2.6%
22	Textile industry	4.9%	2.6%
23	Manufacture of articles of apparel and accessories	3.1%	2.2%
24	Manufacture of shoes and leather and fur articles	1.6%	1.0%
25	Coffee industry	0.7%	1.2%
26	Processing of products of plant origin, including tobacco	3.7%	3.6%
27	Slaughtering and preparation of meat	2.1%	2.4%
28	Refrigeration and preparation of milk and dairy products	1.0%	1.5%
29	Sugar industry	1.0%	0.7%
30	Manufacture and refining of edible vegetable oils and fats	1.4%	1.9%
31	Other food and beverage industries	4.8%	5.9%
32	Miscellaneous industries	2.7%	2.0%

Source: IBGE, Department of National Accounts.

backwardness (or failing to do so) is Hiquino and Amsden (1994). Amsden (2001) also presents a view of recent (post-World War II) catch-up episodes. With regard to the rapid absorption of new technologies and the conditioning factors and implications, see Lal (2000).

In the Brazilian case, the unprecedented nature of the second industrial catch-up period is also clear: firms took decisions and chose methods to achieve catch-up individually. This forms part of the contrasts described below.

II

Stylized comparison of the two catch-up episodes

There are both clear differences and major similarities between the two catch-up periods, as described in stylized form below.

The first phase can be viewed as a concentrated effort to put together the material resources (plant and equipment), work teams, and also know-how and routines that would come to characterize manufacturing operations. Much of the necessary knowledge is acquired with the project, equipment and inputs, through user instructions. From then on knowledge presumably grows, along with experience gained in plant operation. In principle, the greater the degree of protection provided to the industry and the more specific the context (which includes special institutions, labour-force characteristics, infrastructure and available raw materials), the greater the importance of knowledge developed locally.

In the second catch-up phase, based on modernization of work practices and management methods, the guiding principle involved "tropicalization"[7] of products (and to some extent processes) that had already been thoroughly mastered in the leading economies. The aim, in short, was to induce locally established firms to place imitations of imported goods on the market at competitive prices.

The degrees of freedom available for local initiatives in the second catch-up phase were severely limited, because the process began when protectionism was in full retreat. In this setting, any business initiative had to face a barrage of imports – long repressed, in great demand and now finally available. Moreover, it needs to be remembered that the aim was to supply products to the domestic market with levels of performance, reliability, durability, and even compatibility with ecological and legal requirements, which firms in developed economies had long been accustomed to providing.

This means that given the degrees of freedom formerly guaranteed through domestic market protection, imports tended to be even more avidly imitated in the second phase than in the first. This is not to deny the profound similarity with the first catch-up phase: copying is the watchword in both cases. Nonetheless, there are some striking differences.

With the major exception of recent investment flows into the country, the second catch-up phase was essentially based on extracting better results from previously accumulated and/or developed resources, including existing work teams which were now downsized and retrained. Without denying the importance of new (mostly imported) inputs and equipment, investment in the traditional sense of the word was not the lever of change this time. Instead it was basically a question of recombining resources and exploiting characteristics and properties that that were already there, perhaps in latent form. In an operation of this type, imports –embodying new-generation know-how– play a crucial role.

All of this leaves an important issue unresolved, however.

The adoption of more efficient or more advanced inputs and equipment, supported by worker retraining and a reconditioning of facilities, in many cases generated significantly larger production capacity. What happened to sectors where major capacity increases could not be obtained by changing equipment and inputs (and in which upgrading merely entailed replacing a few items of peripheral equipment)? Various firms producing basic inputs were in this situation. And what about sectors in which significant technological change required installation of new plant – oil refining or the electronics complex, for example?

Plainly the second catch-up phase, as described above, did not tend to resolve problems of this type. There were no major investments in refineries (despite 4% annual growth in the demand for petroleum products), or in the manufacture of electronic components (where rapid technical progress had generated major discontinuities).

A comparison of the two catch-up periods is provided below:

The first phase saw new activity sectors established in Brazil. The State defined directions, offered incentives (such as credit on concessional terms), and usually provided the basic services infrastructure.

[7] This is a widely used expression, especially by multinationals.

In this context, public enterprises were conceived of (and treated) as the executors of public policies, based on "missions" entrusted to them. Private firms were now seen as ways to cover gaps in the productive structure that was being established (Barros de Castro, 1993). It should also be recalled that in the Brazilian case foreign direct investment was mainly used as a means of establishing supply chains – such as in the automotive industry (Shapiro, 1994).

In contrast, during the second phase there were no directions prescribed by the public authorities –just assumptions based on economic theory as to the likely direction of the changes the reforms would produce (Mesquita, 1999).

Although it was not receiving guidance from a central decision-coordinator, manufacturing industry does seem to have converged on relatively well-defined patterns of action during the second catch-up phase. Broad directions thus emerged as the sum of all the decisions taken by enterprises individually, but seem essentially to be have been defined by firms making the most of their previously accumulated assets, and by the pressing need for rapid imitation.

Possibly the clearest trend to emerge stems from the fact that opening-up failed to elicit major intersectoral shifts towards labour-intensive and/or natural-resource-intense activities. The Brazilian case even failed to provoke a tendency to specialize in low-skill labour-intensive activities such as product assembly and finishing.

In the initial opening-up period (lasting till about 1995-1996) there were signs that Brazil might follow the Latin American trend of shedding industrial sectors and/or concentration on the final stages of production.[8] This retrograde outcome was avoided, however, except in a few specific cases such as the electronics industry.

Perhaps the most interesting and complex example is provided by the automotive industry. In this case, even recently arrived firms (whose supply links are all external) have made efforts to attract their large international suppliers into the country. A similar pattern can be seen among assembly plants that are well established in Brazil, which have recently started to set up factories in new regions. It is true that the import coefficient, especially in these cases, appears to be far higher than the levels seen during the first catch-up episode. With few exceptions, however, genuine manufacturing does prevail over mere assembly.[9]

In the case of certain traditional industries, following a succession of mergers and/or disappearance of the more precarious firms, a clear trend towards reassertion and modernization has emerged during the last few years. Regional decentralization of activities that make intensive use of low-skilled labour is often a prominent feature of this restructuring process, as exemplified by developments in the textiles and footwear industries.

[8] For a description of the new specialization hypothesis, see Katz (2000).

[9] Among the few cases involving little more than assembly, the Chrysler project in Paraná (producing the Dakota pick-up) has already closed down. Moreover, it has not been easy to gain information on the effective import coefficient. After stating that the national coefficient was about 75%, one assembly-plant director claimed to have no information on the import coefficient of his suppliers. In other words, the 75% applies only to items purchased (locally) from so-called "systemists" located nearby and from a few large domestic suppliers. Strictly speaking, however, even the steel in the body panels (not to mention the electronics, the processed plastics, the gear box, etc.) are all imported. The low import coefficient therefore refers only to purchases by the main company – which operates by assembling kits supplied by the systemists. Given the difficulty of establishing the true import coefficient, it is interesting to note that when seeking to justify a price hike, a large assembly firm that has been in the country for a long time stated that an average of 30% of its costs were in dollars. See *Éxportação é estratégia contra a alta do dólar*, State of São Paulo, 14 October 2001.

III

The macroeconomic context

To complete the comparison of the two catch-up phases, we now consider economy-wide results, especially during the second period.

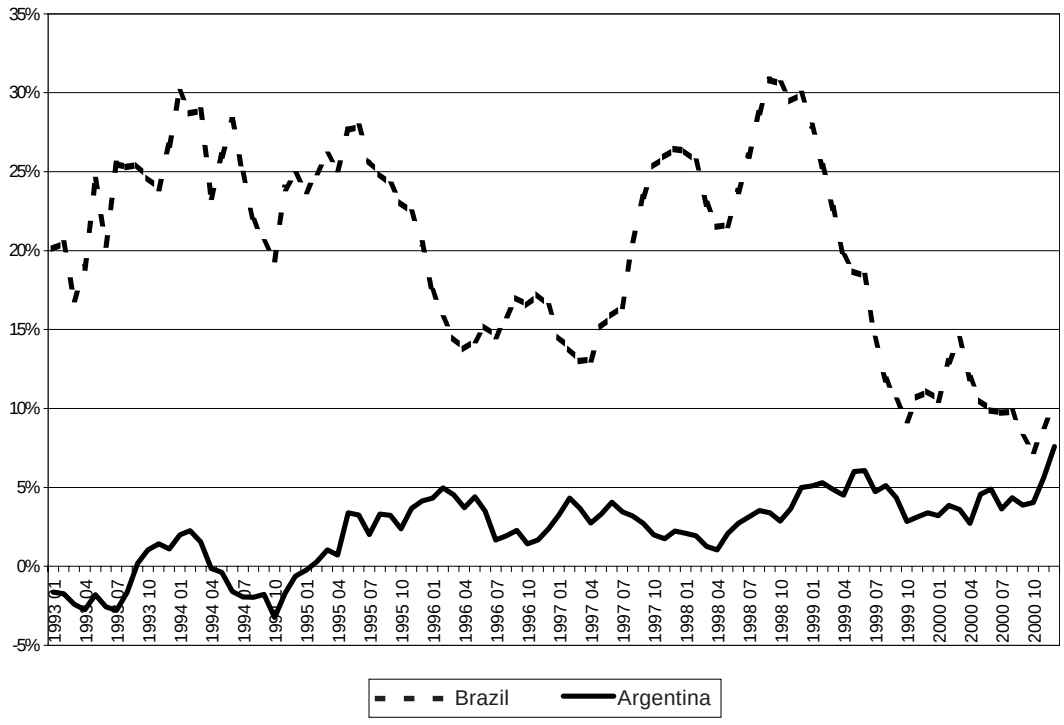
At the height of the first catch-up, between 1968 and 1980, industry grew by an astonishing 200% (i.e. output tripled). Between 1991 and 2000, however, cumulative growth in manufacturing industry amounted to barely 20.7%!

This extraordinary contrast can be viewed from various angles. First of all, it should be remembered that during the second catch-up the economy was severely and almost continuously constrained by public policies – very high average interest rates outside the really critical periods (see figure 1 below); and unprecedented real interest-rate peaks during emergency situations. While the first catch-up phase was supported by (super-) active growth policies, in the second phase macroeconomic adjustment was much more than merely prioritized, and economic growth was all but extinguished, in systematic albeit irregular fashion.

This means that, in addition to being accompanied by years of exchange-rate appreciation (which heightened competition from imports), economic opening occurred in a hostile macroeconomic environment. Were it not for the potential to make significant cost and price reductions in a number of sectors (thereby taking advantage of the expansion of the respective markets), the business sector would have been in serious difficulties.

FIGURE 1

Brazil: Very short term real interest rates
(*annualized seven month moving averages*)[a]



[a] For Brazil, overnight rate. For Argentina, interbank rate for up to 15 days.

Nonetheless, industry displayed strong expansionary tendencies whenever macroeconomic conditions allowed. In other words, average industrial performance was mediocre, despite a capacity to respond vigorously to any opportunities that arose.

In short, the economy's stop-go performance, caused by the high inflation that prevailed from the failure of the Cruzado Plan (1986) until the launch of the Real Plan in 1994, was followed by stop-go of another kind. In the first period there was the growing threat of transition to hyperinflation; in the second, it became increasingly clear that the stop phase was being triggered by the potential shortfall in external financing.

The current pattern of restarts, followed by stop and a return to austerity, has changed over time, however.

The first reason for this is that when vulnerability is detected, it tends progressively to affect expectations – and the country is perceived (and treated) as part of a high-risk group. In these conditions, expansionary upturns are limited to sudden spurts (the "go" phase) that are essentially demand-driven and rapidly supplied (consumer durables especially). When economic agents perceive this vulnerability, they themselves respond to the negative signals by cutting back on expenses and halting the expansion. Recently (in the second and third quarters of 2001) such pro-cyclical behaviour caused demand to fall ahead of supply, which supposedly was being restrained by measures announced by the Government to tackle the electric-power shortage.

On the other hand, and contrary to the pattern described above, investment of both imported and domestically produced capital goods ran ahead of durable goods consumption for the first time during the latest short but vigorous upturn. Both certainly benefited from the lowering of interest rates (shown in table 1), which was mainly associated with the recently adopted flexible exchange-rate regime. Nonetheless, there are no signs that the rate cuts (which have already been partially reversed) were sufficient to generate investments in sectors where plant upgrading, through inputs and equipment, make little difference to installed capacity.

To complete these brief comments, in contrast to the marked instability that accompanied the second catch-up phase, the first period followed a relatively stable growth path.[10] Clearly this represents a further divergence between the expectations of the proponents of major reforms, and the results obtained.

IV

Brief concluding remarks

Returning to the issue of how firms have adapted to the new environment, the domestic market is now similar to the international one in terms of the products demanded by consumers. But this does not mean that Brazilian-based firms –whether domestic or multinational– have assimilated in structure and behaviour to their counterparts elsewhere. This question is now considered in greater detail.

With the intensive modernization of processes, products and marketing, under pressure from opening-up and the mass arrival of new firms in the country (430 of the 500 largest multinational corporations now have operations in Brazil), subsidiary firms reproduce only a few aspects of their corporate structure in the domestic context. In fact they often establish only one or two of their many productive units in Brazil.

At the same time, by clearly prioritizing operational functions, domestic firms paradoxically find themselves adopting structures similar to those of foreign subsidiaries – except, of course, for the important fact that management is located in Brazil. This is understandable, for opening up meant that firms had to sell imitations of imported goods on the domestic market, as rapidly as possible and at competitive prices. It was mainly the mode of production that had to be changed – firms did not need to set up or perform corporate functions such as R&D, design or brand creation/management.

Keeping the focus on domestically-owned enterprises, a major implication of the above is that firms had no need for large amounts of financing, so it

[10] The only major fluctuation in industrial output growth during the lengthy classical catch-up phase took place following the Targets Plan (the effects of which lasted until 1961 and ensured an industrial growth rate of over 10% per year) during the period of macroeconomic crisis and readjustment (1963-1965), when industrial growth was nil.

is hardly surprising that their behaviour was largely unresponsive to interest rates. It is also unsurprising that the firms proved capable of enduring an extremely virulent stop-go regime without being blown off-course in the second catch-up period.

To draw another implication, whose importance can hardly be overstated, a broader perspective is needed.

The current instability of the Brazilian economy is partly explained by (growing) instability in the globalized economy. But there are also local factors in play, at least two of which are intrinsically linked to the features of the second catch-up phase discussed above.

As mentioned earlier, the goods with which Brazilian-based firms carved out spaces in the domestic market were already mature products in industrialized countries – in other words their markets were already more or less saturated. This meant that, although the production of imitation goods at low cost enabled firms to compete in domestic markets (which were still relatively under-supplied), abroad it was another matter. As late arrivals in those markets, firms would have "to buy" market space through predatory competition, or else conquer markets using competitive tools embodied in the high-level functions they did not possess.

In the final analysis, export-led expansion would mean embarking on a different path – learning to grow in a different environment, developing and making use of other resources. That was not the struggle the firms had embarked upon. Moreover, if they had done so, their objectives would have had to reach far beyond manufacturing excellence. They did not have the time or resources needed for this, so the different characteristics prevailing in the domestic and external markets ended up requiring different profiles and strategies.

We know, however, that the surge in imports was an improvised expedient to rapidly attain competitiveness. Having said that, if the dollar had devalued, the resulting cost pressures would have encouraged enterprises to cultivate or even re-establish local supply chains. Given the dollar's appreciation from 1994 to January 1999, however, importing continued to act as a powerful cost-containing mechanism.

The difficulty of exporting compounded by a lack of incentives for import substitution generated a growing imbalance in the country's external accounts, bringing with it a major distortion whereby a dollar earned by a firm on the external market (or saved through import substitution) became worth much more for the economy as a whole than for the individual firm. Statements by firms, dating at least from 1997, showed that their initial difficulties in the struggle for the domestic market had been overcome. Nonetheless, the situation of the country as a whole was becoming increasingly vulnerable.

It is against this backdrop that devaluation should be viewed. For reasons mentioned above, however, it is important to remember that this corrects prices – but does not reverse the earlier accommodation. As an industrialist from the electronics sector recently remarked, Brazil "is not producing the products they want to buy". In other words, with the products they have available, the solution is to gain market share through predatory pricing – which, moreover, would ultimately be made possible by the additional 40% devaluation that has taken place over the past 12 months.

The above discussion can be used to formulate a problem that is likely to become increasingly important in the future.

If the rapid and substantial fall in the relative prices of manufactured products (which occurred in the second catch-up phase, but was clearly absent in the first) merely represented a realignment of prices imposed by opening up, it would be of very limited importance. Its significance would be greater, however, if efforts were then made to develop new competitive tools capable of lowering costs and/or gaining new market positions (through progress on other fronts) on a recurrent basis. In this case the firms would not be merely adapting to prices and product modernization provoked by opening-up, but would be preparing to continuously reassert themselves in a competitive economic environment that had not existed previously. They would also be shaking off a long period in which their interaction with markets had been practically zero – while preparing to enter another scenario in which markets are segmented, recreated or even created by the firms. But this entails going beyond the second catch-up phase – and points to need for one final leap (to be made by the enterprises established here) if the aim really is to achieve sustained growth.[11]

[11] An attempt to describe this final step or "strategic catch-up phase" is made in Barros de Castro and Proença (2001).

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